

## AMENDMENTS TO THE CLAIMS

1. (Currently amended) A process for preparing a  $\text{TiO}_2$  thin film having photo-induced antibacterial and antiviral activities comprising the steps of:

a) providing a reverse micelle solution containing highly-dispersed nano-droplets comprising an organic continuous phase, a non-ionic surfactant, and water;

b) adding a titanium alkoxide and a stabilizer comprising a 2, 4-diketone in an amount between 1 and 10% by volume of the reverse micelle solution to the reverse micelle solution and subjecting the titanium alkoxide to hydrolysis in said nano-droplets of the reverse micelle solution to form a  $\text{TiO}_2$ -containing solution, wherein said stabilizer controls the rate of hydrolysis of said titanium alkoxide;

c) forming a wet film onto a substrate dipped into the  $\text{TiO}_2$ -containing solution onto a substrate, wherein the forming step is performed by a dip coating technique; and

d) drying the wet film and calcining the dried film.

2. (Canceled)

3. (Currently amended) The process of claim 2 1, wherein said non-ionic surfactant is ~~Triton~~ a TRITON<sup>TM</sup> series octylphenol ethoxylate, said organic continuous phase comprises a  $\text{C}_{3-8}$  alkane; said titanium alkoxide comprises a  $\text{C}_{1-6}$  alkyl titanate; and said stabilizer is acetyl acetone.

4. (Currently amended) The process of claim 3, wherein said non-ionic surfactant is ~~Triton X-100~~ TRITON<sup>TM</sup> X-100 octylphenol ethoxylate, said organic continuous phase is cyclohexane, and the titanium alkoxide is selected from the group consisting of ethyl titanate, propyl titanate, iso-propyl titanate, n-butyl titanate and iso-butyl titanate.

5. (Original) The process of claim 4, wherein said non-ionic surfactant has a molar concentration of 0.15 to 0.4M; the titanium alkoxide has a molar concentration of 0.1 to 0.4M; and said stabilizer accounts for 2 to 5% by volume in the reverse micelle solution.

6. (Original) The process of claim 5, wherein said non-ionic surfactant has a molar concentration of 0.2M; and the titanium alkoxide has a molar concentration of 0.2 to 0.3M in the reverse micelle solution.

7. (Original) The process of claim 1, wherein step c) is performed with a withdrawal speed of 2-5mm/s, and step d) is performed with said wet film drying at a temperature ranging from 80° to 120°C for 0.5 to 1.5 hours and said dried film is calcined at 600°C for 1 to 6 hours.

8. (Currently amended) The process of claim 2 1, wherein step c) is performed with a withdrawal speed of 2-5mm/s, and step d) is performed with said wet film drying at a temperature ranging from 80° to 120°C for 0.5 to 1.5 hours and said dried film calcining at 600°C for 1 to 6 hours.

9. (Original) The process of claim 6, wherein said step c) is performed with a withdrawal speed of 2-5mm/s, and step d) is performed with said wet film drying at a temperature ranging from 80° to 120°C for 0.5 to 1.5 hours and said dried film calcining at 600°C for 1 to 6 hours.

10. (Original) The process of claim 9, wherein said dried film is calcined for 3 hours.

11. (Original) The process of claim 1, wherein said substrate is selected from the group consisting of metals, glass and ceramics.

12. (Original) A process of claim 10, wherein said substrate is selected from the group consisting of metals, glass and ceramics.

13. (Original) The process of claim 12, wherein said substrate is stainless steel.

14. (Original) A TiO<sub>2</sub> thin film prepared by the process of claim 1.

15. (Currently amended) A method for killing bacteria and viruses in an environment comprising the steps of:

a) ~~exposing said bacteria and viruses to~~ coating a TiO<sub>2</sub> thin film ~~that has been prepared by coating a substrate with a reverse micelle solution to which a titanium alkoxide has been added, such that said thin film comprises~~ comprising nano-crystalline TiO<sub>2</sub>; ~~and onto a substrate, wherein said TiO<sub>2</sub> thin film is prepared by the steps of:~~

a1) providing a reverse micelle solution containing highly-dispersed nano-droplets, which is made from an organic continuous phase, a non-ionic surfactant and water;

a2) adding a titanium alkoxide and a stabilizer comprising a 2, 4-diketone in an amount between 1 and 10% by volume of the reverse micelle solution to the reverse micelle solution and subjecting the titanium alkoxide to be hydrolyzed in said nano-

droplets of the reverse micelle solution to form a TiO<sub>2</sub>-containing solution, wherein said stabilizer controls the rate of hydrolysis of said titanium alkoxide;

a3) forming a wet film onto the substrate dipped into the TiO<sub>2</sub>-containing solution by a dip coating technique; and

a4) drying the wet film and calcining the dried film; and

b) placing said TiO<sub>2</sub> thin film in the environment under ultraviolet irradiation.

16. (Canceled)

17. (Canceled)

18. (Canceled)

19. (Currently amended) The method of claim 17 ~~15~~, wherein said non-ionic surfactant is ~~Triton~~ a TRITON<sup>TM</sup> series octylphenol ethoxylate; said organic continuous phase comprises a C<sub>3-8</sub> alkane; said titanium alkoxide comprises a C<sub>1-6</sub> alkyl titanate; and said stabilizer is acetyl acetone.

20. (Currently amended) The method of claim 19, wherein said non-ionic surfactant is ~~Triton X-100~~ TRITON<sup>TM</sup> X-100 octylphenol ethoxylate; said organic continuous phase is cyclohexane; and the titanium alkoxide is selected from the group consisting of ethyl titanate, propyl titanate, iso-propyl titanate, n-butyl titanate and iso-butyl titanate.

21. (Original) The method of claim 20, wherein said non-ionic surfactant has a molar concentration of 0.15 to 0.4M; the titanium alkoxide has a molar concentration of 0.1 to 0.4M; and said stabilizer accounts for 2 to 5% by volume in the reverse micelle solution.

22. (Original) The method of claim 21, wherein said non-ionic surfactant has a molar concentration of 0.2M; and the titanium alkoxide has a molar concentration of 0.2 to 0.3M in the reverse micelle solution.

23. (Currently amended) The method of claim 16 ~~15~~, wherein said step a3) is performed with a withdrawal speed of 2-5mm/s, and step a4) is performed with said wet film drying at a temperature ranging from 80° to 120°C for 0.5 to 1.5 hours and said dried film calcining at 600°C for 1 to 6 hours.

24. (Canceled)

25. (Canceled)

26. (Original) The method of claim 19, wherein said step a3) is performed with a withdrawal speed of 2-5mm/s, and step a4) is performed with said wet film drying at a

temperature ranging from 80° to 120°C for 0.5 to 1.5 hours and said dried film calcining at 600°C for 1 to 6 hours.

27. (Original) The method of claim 20, wherein said step a3) is performed with a withdrawal speed of 2-5mm/s, and step a4) is performed with said wet film drying at a temperature ranging from 80° to 120°C for 0.5 to 1.5 hours and said dried film calcining at 600°C for 1 to 6 hours.

28. (Original) The method of claim 21, wherein said step a3) is performed with a withdrawal speed of 2-5mm/s, and step a4) is performed with said wet film drying at a temperature ranging from 80° to 120°C for 0.5 to 1.5 hours and said dried film calcining at 600°C for 1 to 6 hours.

29. (Original) The method of claim 22, wherein said step a3) is performed with a withdrawal speed of 2-5mm/s, and step a4) is performed with said wet film drying at a temperature ranging from 80° to 120°C for 0.5 to 1.5 hours and said dried film calcining at 600°C for 1 to 6 hours.

30. (Original) The method of claim 29, wherein said dried film is calcined for 3 hours.

31. (Original) The method of claim 15, wherein said substrate is selected from the group consisting of metals, glass and ceramics.

32. (Canceled).

33. (Original) The method of claim 30, wherein said substrate is selected from the group consisting of metals, glass and ceramics.

34. (Canceled).

35. (Currently amended) The method of claim 33, wherein said substrate metal is stainless steel.